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ABSTRACT

An apparatus for moving a carriage assembly from an initial position to a target position relative to a storage medium rotating at a circumferential velocity. The apparatus includes a suspended body having a center of mass and a lens defining an optical axis. The center of mass being disposed substantially on the optical axis. The carriage assembly suspends the suspended body and has a center of mass on the optical axis proximate the center of mass of the suspended body. A drive producing a plurality of balanced and symmetrical forces moves the carriage assembly from the initial position to the target position. A processor determines a velocity trajectory relative to the radial distance of the initial position and the target position to the center of the medium, the circumferential distance between the initial position and the target position, and the initial circumferential velocity of the medium. The processor directs the drive to move the carriage assembly using the velocity trajectory so that the carriage assembly will arrive radially and circumferentially at the target position at substantially the same time and the moments produced by the forces are effectively absent. Additionally, the rotation of the storage medium may be changed from the initial circumferential velocity to a target circumferential velocity, and the velocity trajectory is further related to the target circumferential velocity.